

# IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: SANGESLAND, Sigbjorn      Group Art Unit: 8792

Serial No.                      10/507,049                      Examiner: C.R. Buchanan

Filed:                              09/08/2004                      Atty. Dkt. No: PROT008-US

For:      METHOD AND DEVICE FOR LINER SYSTEM

To:      Mail Stop Amendment  
         Commissioner for Patents  
         PO Box 1450  
         Alexandria, VA 22313-1450

From:

24222

Commissioner:

This declaration is offered in support of the above application for patent.

## RULE 132 DECLARATION OF SIGBJORN SANGESLAND (37 CFR 1.132)

I have a Master of Science degree in mechanical engineering and a PhD degree in petroleum engineering from Norwegian University of Science and Technology (NTNU). I have 25 years experience in education, research and development within the petroleum technology.

The pre-positioned liner technique of this invention was developed as a method that can be used in order to create at least one extra casing point in the bore hole of a subsea well, which results in an additional section of liner and hence the possibility of achieving a deeper well. This is important because when using conventional methods, an additional casing section (liner) may require that a larger (larger than conventional/standard) subsea wellhead, subsea blowout preventer (BOP) and drilling riser would have to be used, in order to reach the target (reservoir) with sufficient hole diameter.

The method of the invention may also allow a lower class, less costly drilling vessel to be used since the method can be used to reduce the sizes and weights of the high pressure

wellhead, the subsea BOP and the drilling riser, without making any sacrifice to the hole size compared to conventional methods.

The following is a description of an illustrative procedure involving use of the invention:

- General Procedure

1. The hole for the first conductor or structural casing is drilled without a drilling riser or well control equipment
2. The first structural or conductor casing is run from the rig with a temporary or permanent guide base including a low pressure wellhead housing, into the predrilled hole for the first structural casing. (Alternatively this operation is done with so called jetting procedures).
3. The structural casing is cemented to sea bed. (Alternately the structural conductor is jetted in place).
4. The hole for the surface casing which contain the high pressure wellhead is then drilled without the riser and with drilling fluid return to sea.

From this point reference is also made to an animation which we are attempting to submit in this case separately. The animation may be run in Internet Explorer. Included as attachments to this declaration are snapshots of the animation (the snapshots are numbered as below)

5. *Snapshots 1-5* From the rig the surface casing is now run into the sea and possibly through the guide base located on the seabed and into the surface hole. This casing could be of a greater size than conventional, since it is run in the open sea and hence is not dependant on being run through equipment with size restrictions other than the first structural casing/conductor and low pressure wellhead housing. Before the high pressure (HP) wellhead is installed on top of the surface casing on the rig floor of the drilling rig, a second (pre-positioned) casing liner is run into the surface casing now suspended from the rig and hung off inside the surface casing (i.e., the pre-positioned liner would not pass through the HP wellhead).
6. *Snapshots 6-8* Now the surface casing with the HP wellhead and the second casing (the pre-positioned liner) already installed inside it, are run from the

rig together and into the surface hole. The HP wellhead is landed out and suspended in the LP wellhead housing.

7. The surface casing is then cemented.
8. *Snapshot 9* The BOP and riser, **which has a smaller diameter than the pre-positioned liner**, is then run and latched on to the HP wellhead. The BOP is then tested.
9. *Snapshots 10-12* A drillstring with a small bit and underreamer is then run through the riser and into the pre-positioned liner (casing) inside the surface casing. The next hole section is then drilled with an underreamer. This next hole section has the same length as the hole section for the surface casing. (Alternatively, the pre-positioned liner can be equipped with a liner drilling shoe and the pre-positioned liner can be drilled in place.)
10. *Snapshots 13-15* After the drill bit is pulled back, a special release mechanism for the pre-positioned liner is run and the pre-positioned liner is released from the top of the surface casing and finally installed by being run into the open hole section just drilled.
11. *Snapshot 16* The now-installed liner is then set as a conventional liner hanger with pack-offs or other mechanisms set or hung off inside the lower end of the surface casing and the casing liner cemented.

**In this fashion one or more extra casing can be installed in a well that has a greater outside diameter than the Inside Diameter (ID) of the high pressure wellhead , subsea BOP or drilling riser. Drilling below the surface casing requires riser and well control equipment installed, which will limit the size with conventional methodology and technology.**

(Snapshots 17-23 show the possible installation of an expandable liner below the pre-positioned liner)

The pre-position liner can be installed inside the surface casing before the wellhead, BOP and the riser is installed. This arrangement allows for one or more extra casing section (the

pre-position liner) since it will not be affected by the inside diameter of the HP wellhead, subsea BOP or the drilling riser.

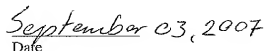
Hahn et al. do not indicate or explain the method explained above. Hahn et.al. teach a system where the liner extends to a rig 180 at the surface 167 (line 15 - 16, page 4). The rig 180 also includes conventional devices, such as mechanisms to add additional sections to the liner 120 as the wellbore is drilled (line 20-23, page 4).

In my solution, the pre-positioned liner set and system is terminated below the subsea wellhead, and no additional section to the pre-positioned liner set can be added after the wellhead is connected to the wellhead casing since the diameter of the wellhead, BOP and riser is restricted. It is only by the technique of the invention that it is possible to achieve one or more additional casing sections without having either to increase the diameter of the riser; BOP and wellhead or ending up with a smaller hole diameter at the bottom of the well.

The undersigned declares that all statements of his own knowledge made herein are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application of any patent issuing thereon.

Respectfully submitted,

  
SIGBJØRN SANGESLAND

  
Date



Rotary Table (RKB)



# PREPARING TLS ON THE DRILLING VESSEL

Preparing of surface casing (14"),  
suspended from slips in rotary table

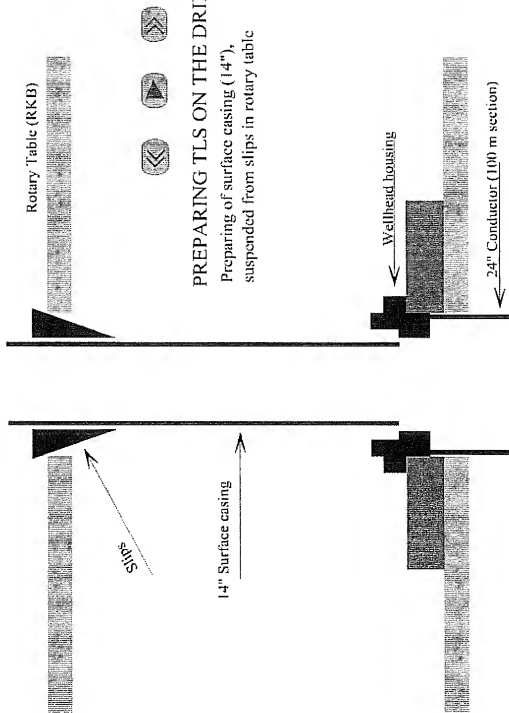
14" Surface casing



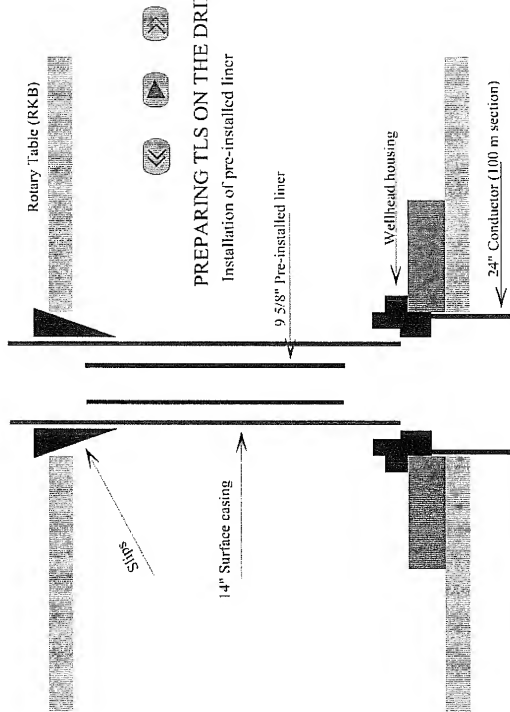
Wellhead housing

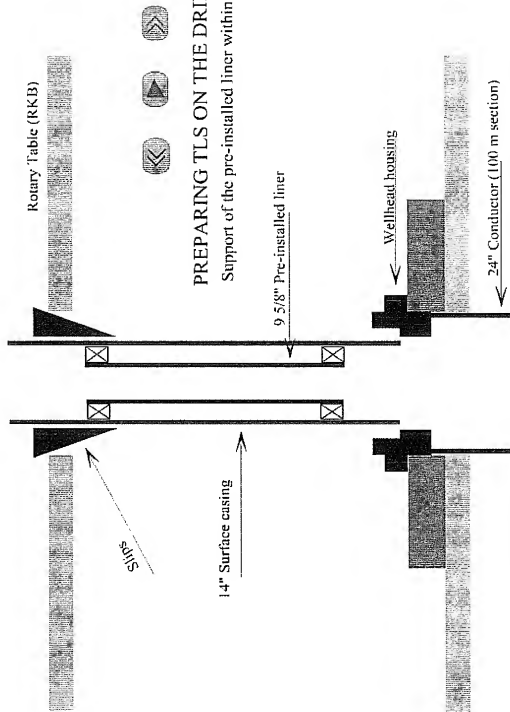
24" Conductor (100 m section)

1

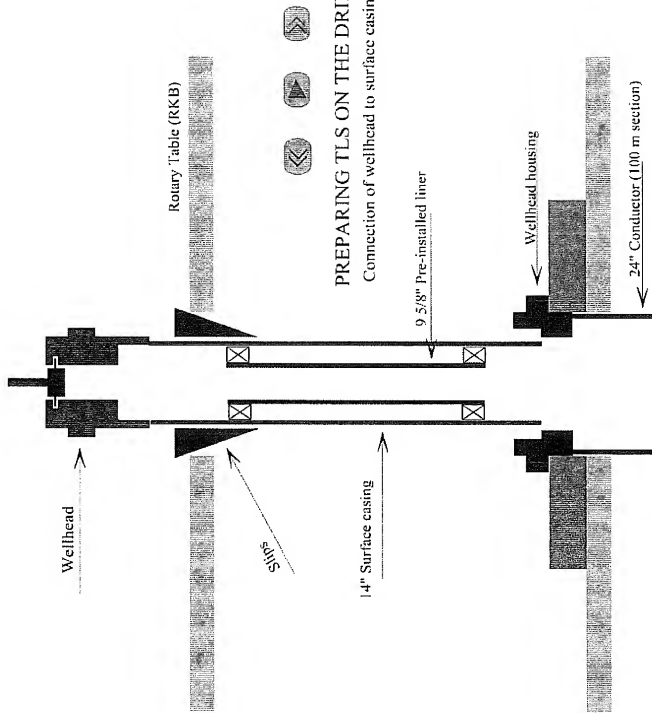


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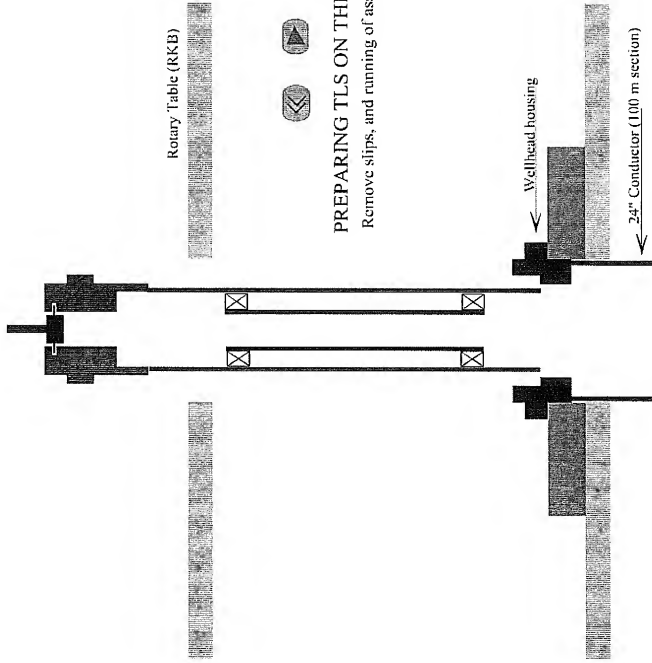








# PREPARING TLS ON THE DRILLING VESSEL Connection of wellhead to surface casing

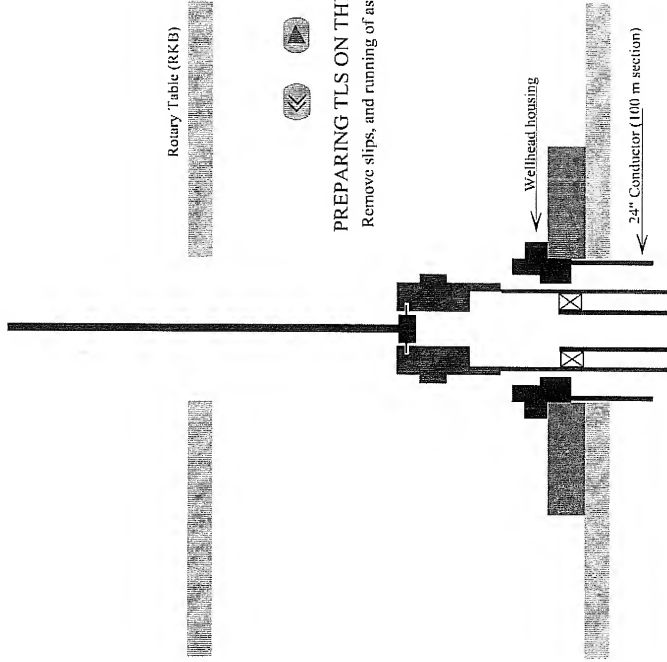


# PREPARING TLS ON THE DRILLING VESSEL

Remove slips, and running of assembly into the subsea borehole



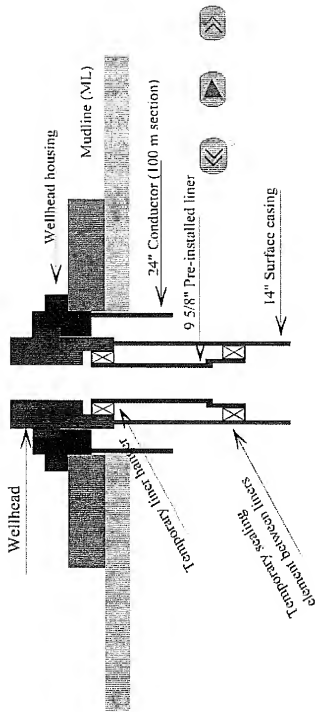
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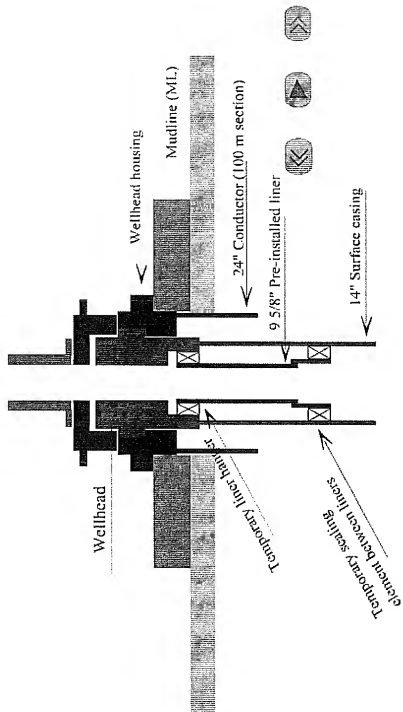


# PREPARING TLS ON THE DRILLING VESSEL

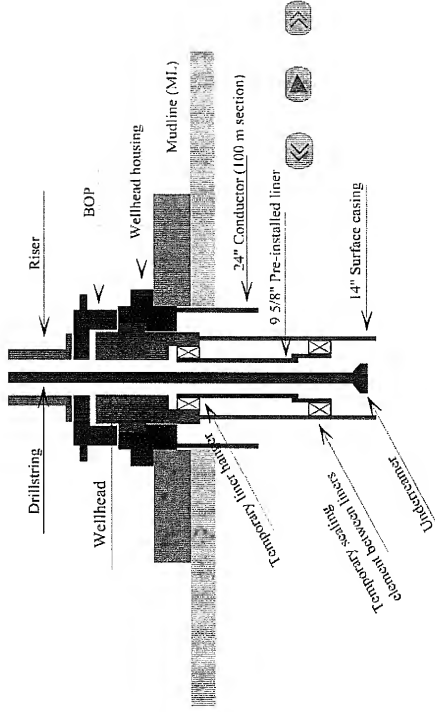
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24" Conductor (100 m section)

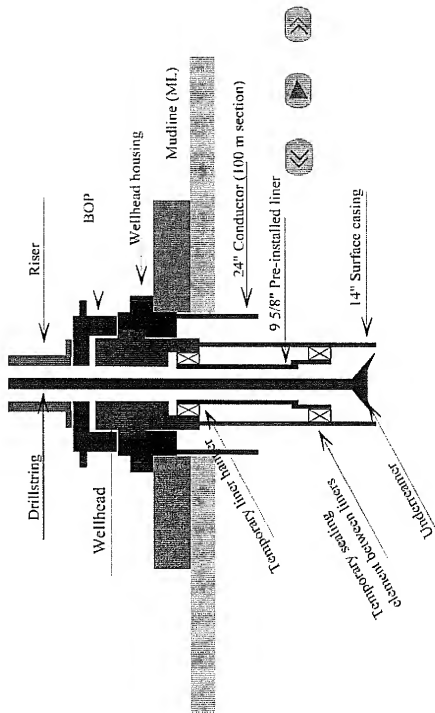


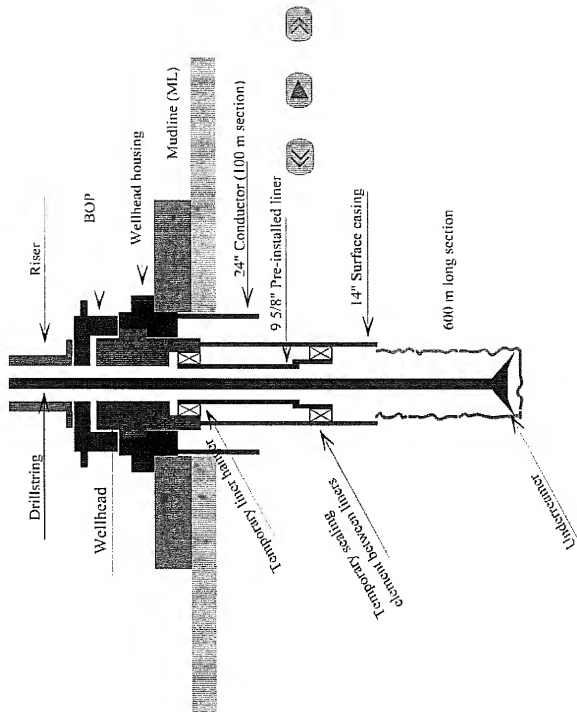


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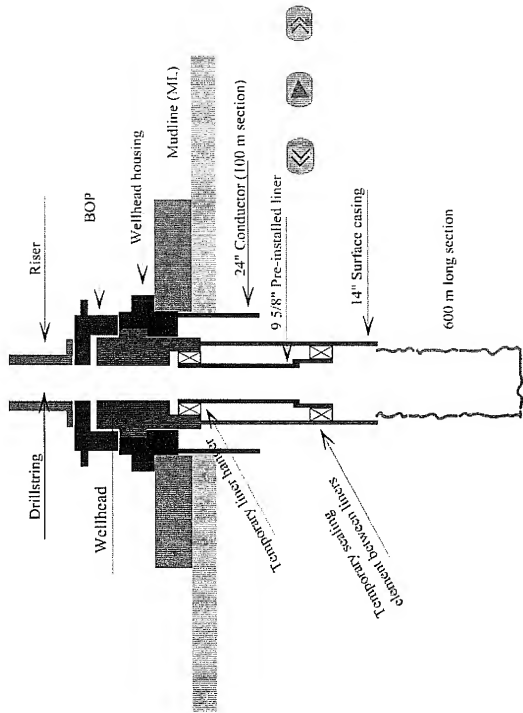


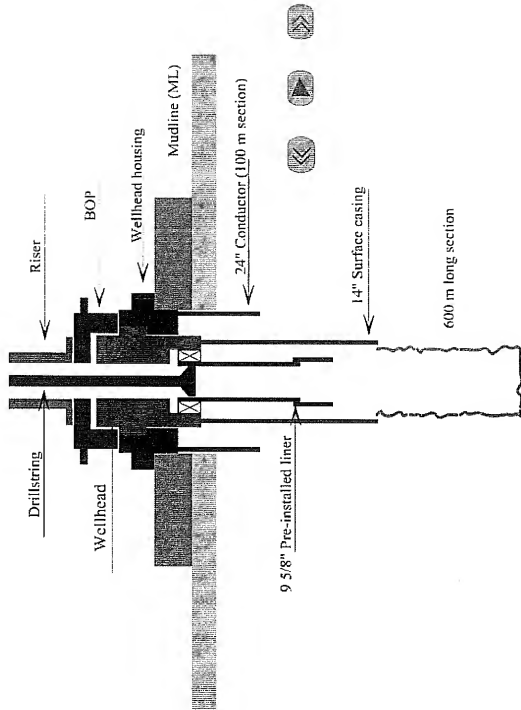
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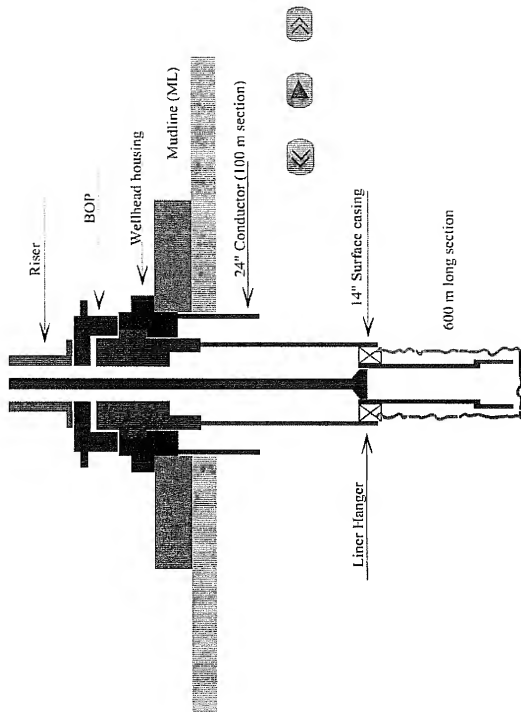




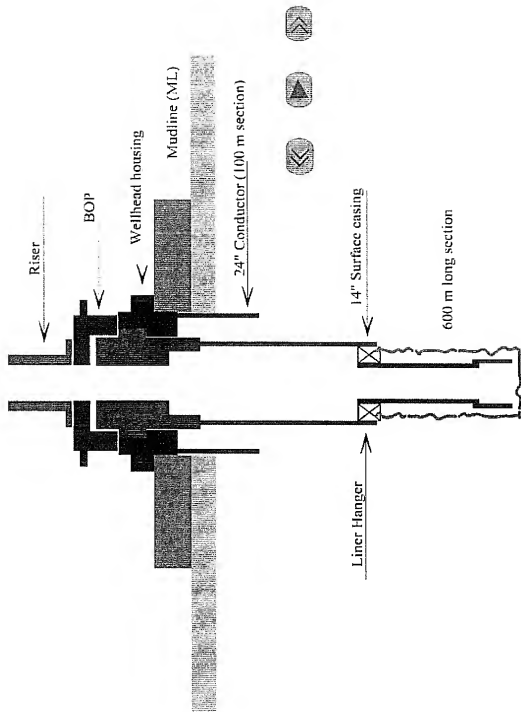


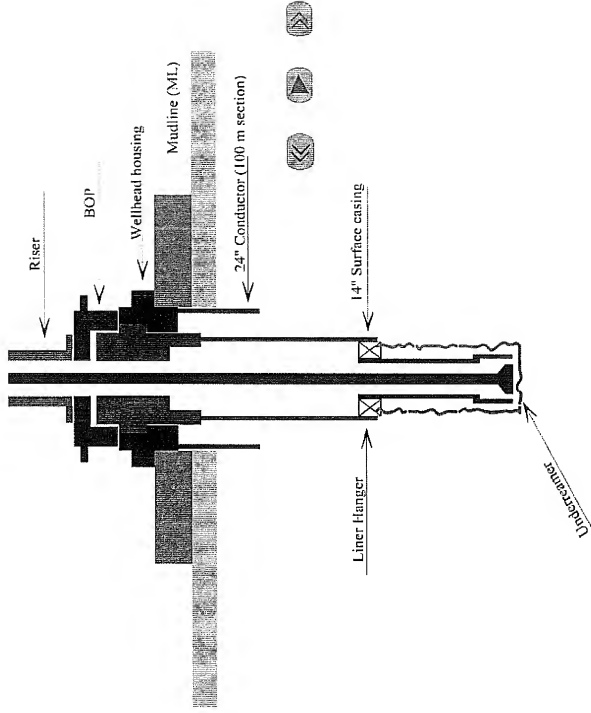


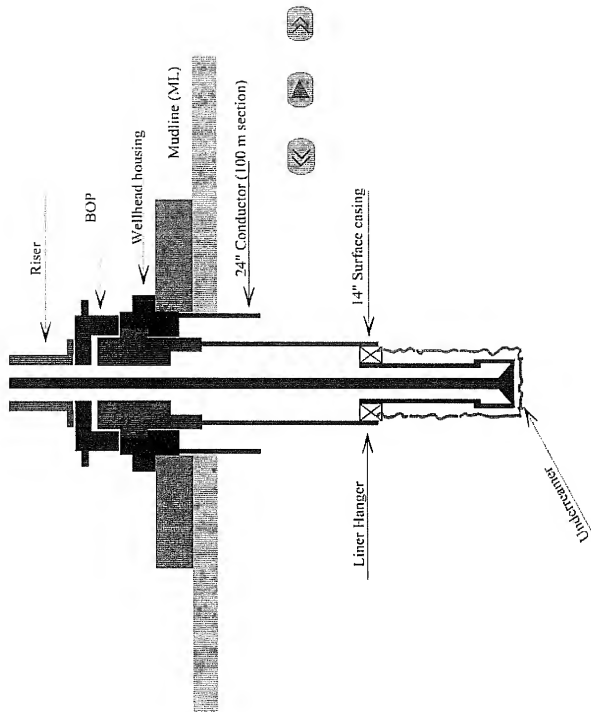
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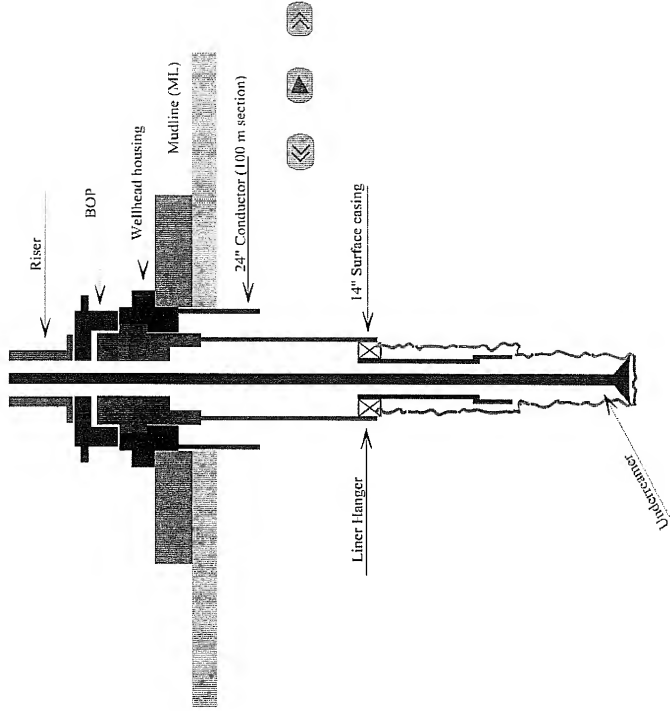
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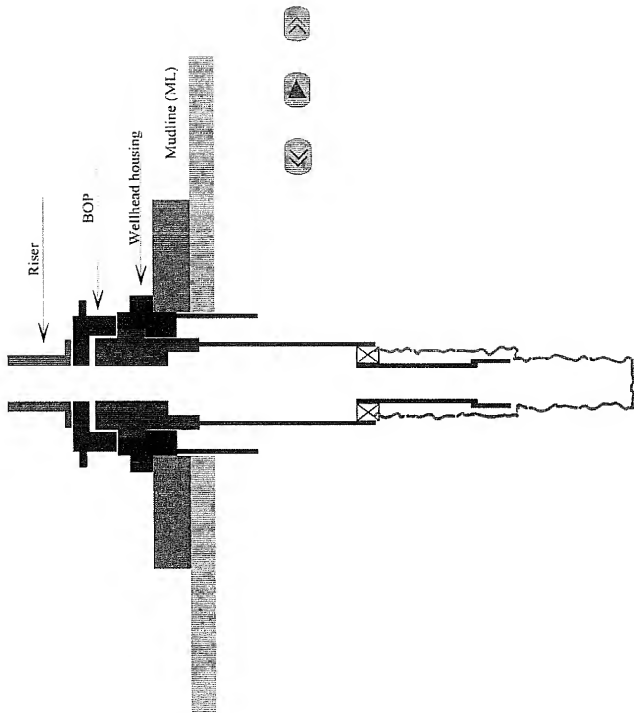




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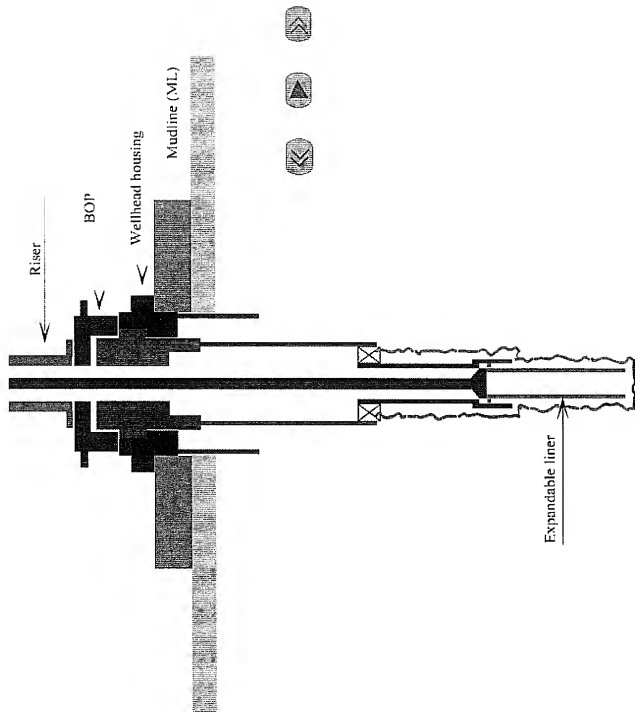


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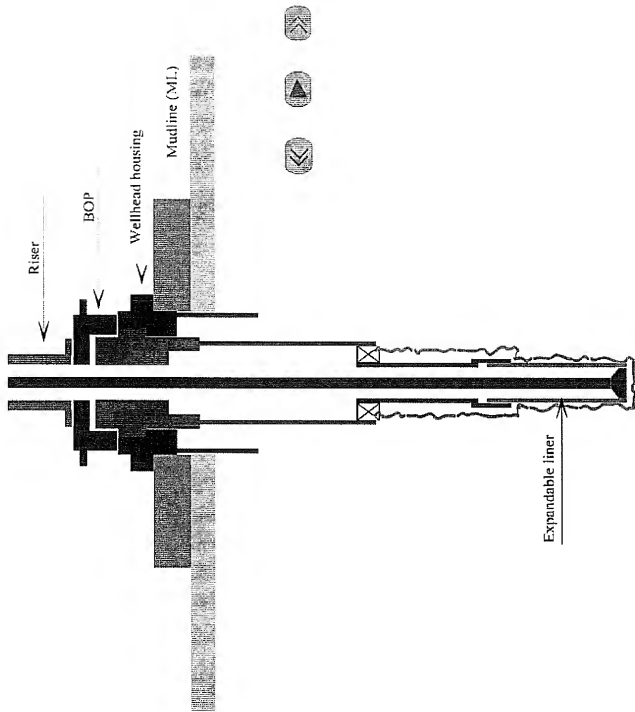


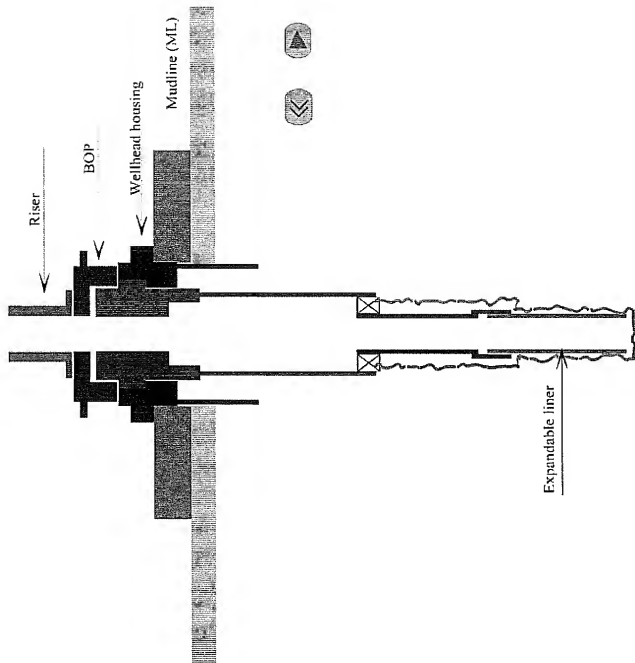
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